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**THE INCA BONE AND KINDRED FORMATIONS AMONG
THE ANCIENT ARIZONIANS.**

BY DR. WASHINGTON MATTHEWS, U. S. A.

While making excavations among the prehistoric ruins in the valley of the Salado, in Arizona, and exploring in the neighboring country in 1887-'88, the Hemenway Southwestern Archæological Expedition, under the direction of Mr. F. H. Cushing, discovered indications that the ancient civilization of Arizona had a more intimate relationship with that of Peru than the ancient civilization of the valley of Mexico and of many other places which lie between Arizona and Peru. The following are some of the indications:

1. In several instances, near the walls of the apartments, groups of four small stones were found—three globular and one ovoid—such as constituted the bolas of the South Americans, and of the employment of which among North American Indians we have no historic evidence.
2. On the rocks in the surrounding mountains there are pictographs which are thought to represent herdsmen or hunters in the act of throwing the bolas.
3. In the pictographs, and associated with the figures of the bola-throwers, are representations of an animal apparently allied to the domesticated camelidæ of South America (*vicuña, guanaco, llama*).
4. Numerous well-executed and perfectly preserved terra-cotta figures of this animal were discovered where they had apparently been deposited as sacrifices. These figures are unlike any known animal of the present North American fauna, and are pronounced by zoological experts to be representations of some animal closely allied to the llama. Historically they are unknown in North America, unless a vague description of a wool-bearing animal, seen among the Pueblos by Coronado in 1541, may have reference to them. None of their bones have been found in the ruins, but the fossil bones of such an animal are to be found in Arizona. Such are a few of the many indications of a former connection between the people of Peru and those of Arizona. There is of course much to be said against these evidences. They are not by any means conclusive. The whole subject is *sub-judice*. Mr. Cushing has prepared an article on his discoveries, which I hope

will soon be published. Were I able to anticipate him I would not, but merely mention the above facts as a necessary introduction to my own discourse. In this stage of the debate, light which may come from any source cannot be otherwise than welcome, and the examination of the osseous remains of these Arizonians has not proved valueless.

While engaged in collecting, as they were unearthed, the bones of the people of the old Salado cities, at Camp Hemenway, in the Salado valley, in 1887, Dr. J. L. Wortman, of the Army Medical Museum, observed the frequent occurrence of the Inca bone (*os Incae* or epactal bone) in the skulls, and in a conversation, published on his return to Washington, he spoke of this observation. He had, however, no opportunity in the field for making a careful study of the subject and determining the comparative frequency of the anomaly; besides, the bones when exhumed were in such a friable condition that they could not be properly examined until strengthened and repaired.

The skulls, some 90 in number, were sent to the Army Medical Museum for study; 57 of them were, with much labor, repaired and put together; the rest are in a hopelessly fragmentary condition; yet among the fragments 31 occipital bones were found, in which the more important anomalies might be studied. This gives us in all an ample series of 88 specimens to work with.

I will not here enter into an elaborate description of these anomalies, nor will I discuss at length their morphological characters. Such elaboration is not necessary for my purpose and is forbidden by the limits assigned to this paper. To make myself readily understood to such of my readers as have not previously studied the formations here considered, I depend for the most part on illustrations taken from Arizonian skulls in the Hemenway collection and reduced to one-half natural size. Those who desire further information on the general subject are referred to the works of Virchow,* Anoutchine,† and others.‡

* Ueber einige Merkmale niederer Menschenrassen am Schädel. von Rudolf Virchow. Berlin, 1875.

Zeitschrift für Ethnologie. v. 20, 1888. p. 470.

† Revue d'anthropologie. 1883. p. 140 (Review).

‡ Éléments d'anthropologie générale, par le Dr. Paul Topinard. Paris, 1885. p. 789. p. 791, foot-note.

In the first place let us consider the true epactal bone or *os Incae*. It exists in all races. It is considered a characteristic of the Peruvian

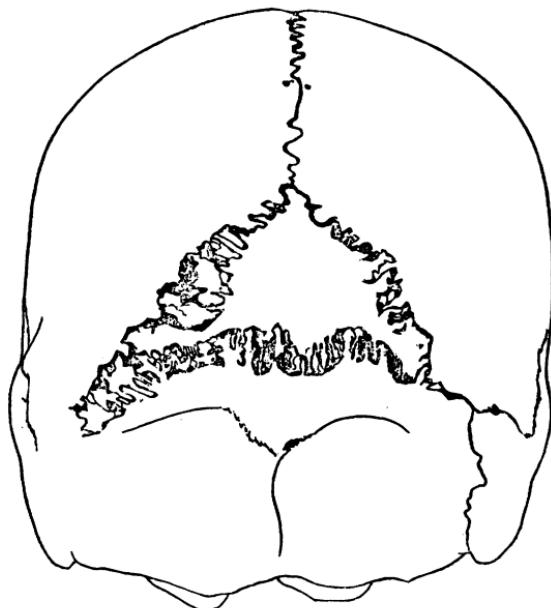


FIG. 1.

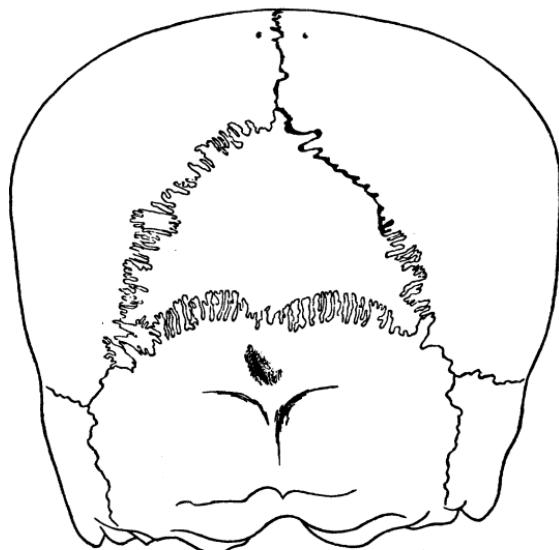


FIG. 2.

or Inca race only by reason of its great frequency among them. How much more frequently it is found among them than among other peoples hitherto studied will be seen in the accompanying table.

Figs. 1 and 2 represent typical forms of this triangular bone in two varieties described by Virchow.* In one the persistent transverse occipital suture runs directly from one asterion to the other, and seems but a continuation of the parieto-mastoid suture; in the other, the ends of the transverse occipital suture join the lambdoidal on each side a short distance above the asterion. The epactal bone shown in fig. 1 was complicated with a multitude of Wormian bones, many of which, very minute, pertained to the outer table only and, falling out, left the broad indefinite border shown in the figure. In our series of 88 we have five Inca bones as true and typical as these—a percentage of 5.68.

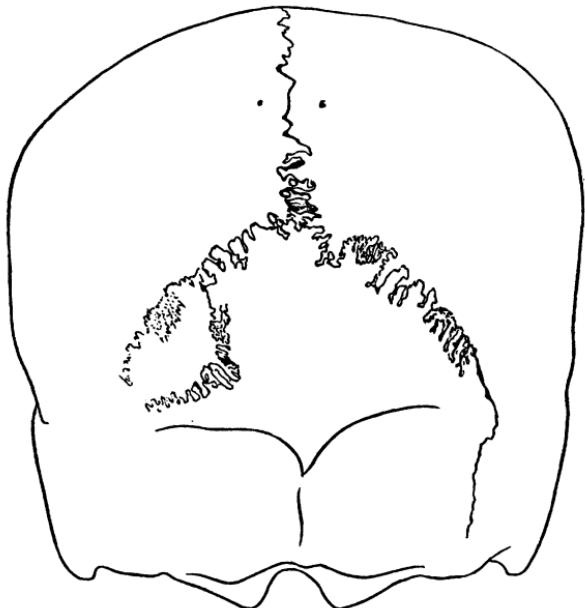


FIG. 3.

Fig. 3 represents the only specimen in our collection of what Anoutchine calls the incomplete *os Incae*. In this the left third of the transverse occipital suture is persistent and, connecting with

* Zeitschrift für Ethnologie. 1888. p. 470.

the lambdoidal suture above by an almost vertical suture, separates from the rest of the occipital, a triangular bone, which probably represents one original point of ossification. This, added to the number of the complete *os Incae*, gives us 6 specimens or a percentage of 6.81 of both these forms combined.

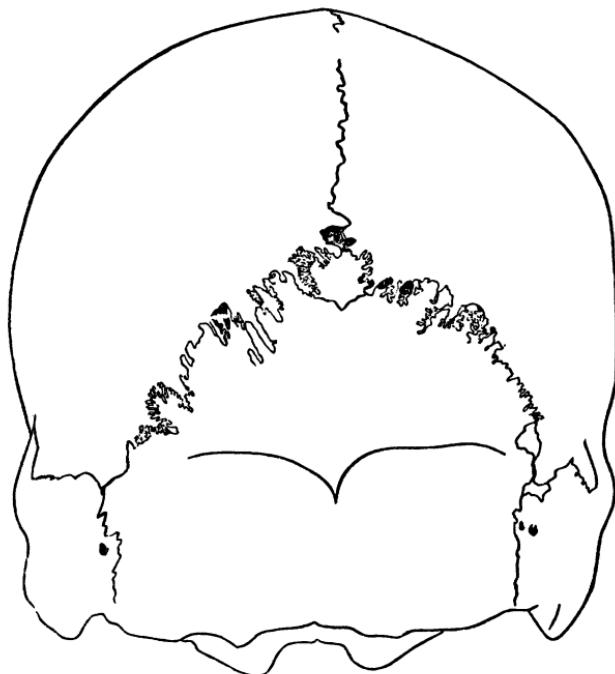


FIG. 4.

As an anomaly which is sometimes confounded with the epactal bone, though having a very different embryologic origin, the quadrate bone or, *os quadratum*, is to be considered. Fig. 4 illustrates the only specimen in the collection which can with any propriety be classed under this head, and it is neither a large nor a typical specimen. Some might be inclined to regard it as a triquetral bone of the apex. One instance of this form in 88 occiputs gives us a percentage of 1.13.

Immediately above the apex of the quadrate bone in figure 4 is seen an open space which was evidently once filled by a small *os sagittale*.

Every separate ossicle or collection of ossicles observed at the apex of the occipital, except a quadrate or epactal bone, is placed in Virchow's class of *os triquetrum seu apicis*, even when it lies entirely on one side of the median line, or is one of a numerous

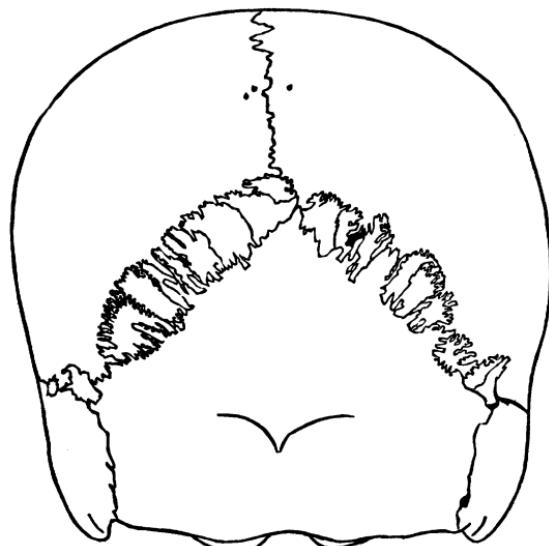


FIG. 5.

series of Wormian bones like that shown in fig. 5. It has been found difficult or impossible to draw a definite line of distinction between such and the most typical *os apicis*.

In including all these forms in this class we may have exceeded the limits set for themselves by other observers, and this may account for the large number (16) and the comparatively high percentage (18.1) of *ossa apicis* which this collection furnishes. But if none but the most certain examples were taken we would still have a higher percentage than is found in any other race.

There is one anomaly which we have not tabulated, namely, the vestige of the transverse suture, which is sometimes seen in the neighborhood of the asterion, on one or both sides, and which often extends but a few millimetres in the direction of the median line. This is omitted because of the uncertainty attending the examination of minute examples, arising from abrasions to the outer table, post-mortem marginal fissures, and other injuries common in these old and friable bones.

In this connection I introduce figure 6. Here we see a peculiar punctured or honey-combed appearance of the outer table in the line of the transverse suture. It seems to be a vestige of that suture of unusual character, confined to the outer table. It is the only speci-

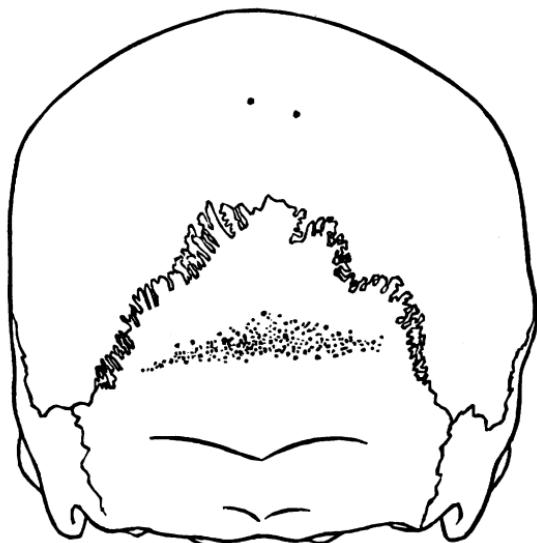


FIG. 6.

men of its kind in the Hemenway collection; but there are some similar formations in the general collection of our Museum.

The following table is made up of four of Anoutchine's tables (consolidated), with the following modifications: 1. All the races are placed in one order and are called each by one name. 2. A title in his table of "Americans in General" is omitted; it would serve, in connection with this paper, to confuse rather than to enlighten the reader; its figures are obtained merely by adding those of "Peruvians" to those of "Americans not Peruvians." 3. The Ancient Arizonians have been added and placed at the head of the list. Anoutchine's percentages are based on a liberal number of specimens, ranging from 157 in Australians and Tasmanians to 6,871 in Caucasians in general. The Peruvian specimens are 664, and the Americans not Peruvians are 390 in number.

TABLE SHOWING THE PERCENTAGE OF THE INCA BONE AND ALLIED FORMATIONS AS FOUND IN VARIOUS RACES.

RACES.	Complete <i>os Incae.</i>	Complete and incomplete <i>os Incae.</i>	<i>Os quadratum.</i>	<i>Os trigonum seu opicis.</i>
Ancient Arizonians-----	5.68	6.81	1.13	18.1
Peruvians-----	5.46	6.08	1.05	10.5
Americans not Peruvians-----	1.30	3.86	0.26	5.63
Negroes-----	1.53	2.65	2.11	1.19
Malays and Polynesians-----	1.09	1.42	0.76	0.43
Mongolians-----	0.56	2.26	0.57	3.02
Papuans-----	0.57			
Caucasians in general-----	0.46	1.19	0.18 ?	1.59
Caucasians of Asia-----	0.51	1.70	0.41	2.36
Europeans-----	0.45	1.09	0.13 ?	1.42
Melanesians-----		1.65	0.62	2.87
Australians and Tasmanians-----	0.0 ?	0.64 ?	0.64	0.64 ?

The foregoing table speaks for itself, and but little comment is necessary. It shows a most remarkable correspondence in the frequency of these anomalies between the ancient Arizolian and Peruvian races. It shows also that while, in respect to three of the anomalies, the Peruvians are widely separated from the rest of the human race as heretofore studied, the Arizonians are still further removed. In short they out-Inca the Incas.

It has been maintained* that the artificial pressure to which Peruvian skulls were subjected produced the anomaly of the epactal

* Dissertation sur les races que composaient l'ancienne population du Pérou. Par M. L.-A. Gosse, Docteur en Médecine.—Mémoires de la Société d'anthropologie, vol. i.

bone. We consider that the arguments in favor of this theory are already successfully refuted, but will nevertheless add to the refutation such testimony as the Hemenway collection offers. The Arizonian skulls bear not the slightest evidence of intentional depression or distortion of any kind, especially of that sort produced by the application to the forehead of the head-board, such as the Peruvians once used and some Indians of the Northwest coast still use. A certain amount of accidental or unintentional occipital depression is to be found in the majority of the skulls, due apparently to the use of a wooden-backed baby-basket with an insufficient pillow, but it is a depression of no greater degree or frequency than is found in many American peoples, among whom the epactal bone is comparatively rare. Furthermore, it is not in the most depressed occiputs of the Arizonian skulls that the epactal bone is most common, but in those that are fairly rounded and prominent.

The above facts are surely not without significance and, since they are elucidated, we look forward with increased interest to future explorations among the long-deserted homes and fields and sacrificial caverns of the builders of the *casas grandes*.

ARE THERE TOTEM-CLANS IN THE OLD TESTAMENT?—The latest answer to this question is from the pen of Joseph Jacobs, and appears in the "Archæological Review" for May, 1889. He concludes his learned paper as follows:

(1.) If anthropology teaches that the totem arrangement is a necessary stage of national development, there are sufficient indications of such arrangements in the names of the Edomite clans (Gen. xxxvi).

(2.) There are sufficient "survivals" of totemism in the names of the Israelite clans, their forbidden food, personal names, tattooing, family feasts, and blood avengers, to render it likely that they once had a totem organization like the other *B'nê Abraham*.

(3.) But there are not any signs of the actual existence of totemism in historic times among the Hebrews, such as Professor Smith contends for in the cases of David and the crucial passage (Ez. viii, ii).

WASHINGTON MATTHEWS.

SEXUAL TRADITION.—The Onondagas and also the Cayugas and Tuteloes relate two distinct stories in regard to a demon of lechery called *o-hnă'-tcă'* (thigh). This fabulous monster is represented to have consisted simply of the naturally united legs of a bodiless and headless adult human being, having either unisexual or bisexual parts of reproduction, which parts sometimes became detached and floated about enwrapped in lambent flames. The Onondagas assert that at one time part of their tribe dwelt near a small lake, now Otisco lake, N. Y. The lake derives its name from the fact that its waters were infested by these *o-hnă'-tcă'*. The original form of the word was *yo-ti's-ko'*, "they float or are immersed," the antecedent of "they" being the *o-hnă'-tcă'*. They further state that such was the licentiousness of their people that they became affected with a species of mania, and that when they were in this deplorable condition they could not go near the lake shore after twilight, for vast numbers of the *o-hnă'-tcă'* would leap out of the lake and, barking, pursue the luckless people to the very doors of their cabins. Finally, these demons became so numerous and so bold that the tribe in solemn council decided to migrate from that ill-omened lake.

Near Brantford, Canada, there are some hills adjacent to and abutting on the Grand river, called Tuteloe Heights from the fact that the Tuteloes and Cayugas formerly dwelt there together. They say that licentiousness became so rife among them that their fertile valley also became infested with the demons of lechery. The people bore with the incursions of the unnatural pest for about two years, and then they determined to leave that infested locality.

How the afflicted people mentioned above accounted for those abominable daimons of lechery we may partially gather from a remark that accompanies both stories. "Those things (daimons), it is said, dunned them," is the remark to which I refer. If a person devotes himself in season and out of season to a pursuit or to the gratification of some appetite or passion he is said to be "dunned" (for his life) by the tutelar daimon of any such pursuit, appetite, or passion which said person may then be blindly following or gratifying to his injury. To-day, if a person is addicted to the inordinate use of strong drink, or is given to gambling or to any other wickedness, with an apparent inability to shun it, it is whispered about that "the Devil 'duns' him" for his life.

J. N. B. HEWITT.